CLAIMS:

1. A wiring substrate having a dielectric substrate having a high-frequency component and a transmission line formed on its surface,

said dielectric substrate being formed with an opening in a predetermined cross-sectional shape,

a high-frequency connecting pad coated with a conductor layer around said opening being formed on a reverse surface of said dielectric substrate,

a power pad being formed on the reverse surface of the dielectric substrate to be connected with the power line formed on the surface of the dielectric substrate,

a matching section for high-frequency coupling said transmission line and a waveguide structure connected to said high-frequency connecting pad to each other being formed in said opening.

2. The wiring substrate according to claim 1, wherein

said high-frequency connecting pad is connected to the waveguide structure by a brazing material.

3. The wiring substrate according to claim 1, wherein

a cover for hermetically sealing said high-frequency component is attached to the surface of said dielectric substrate.

4. The wiring substrate according to claim 1, wherein

the conductor layer in said high-frequency connecting pad is hollowed inward from the reverse surface of the dielectric substrate.

5. The wiring substrate according to claim 1, wherein

two or more high-frequency connecting pads are formed on the reverse surface of said dielectric substrate.

6. The wiring substrate according to claim 1, wherein

said transmission line is a microstrip line, and

said matching section comprises a microstrip line having an opened terminal end, a slot hole formed in a ground layer for the microstrip line, and a dielectric provided below the slot hole.

7. The wiring substrate according to claim

6, wherein

said slot hole is formed at the center of the opening of said high-frequency connecting pad,

a vertical conductor for connecting said ground layer and said high-frequency connecting pad is formed along said opening, and

said matching section is formed in a region enclosed by the vertical conductor.

8. The wiring substrate according to claim 1, wherein

said dielectric substrate is composed of ceramics.

9. The wiring substrate according to claim 1, wherein

said wiring substrate being mounted on a predetermined wiring board by connecting said high-frequency and power pads to the wiring board by a brazing material.

10. A wiring board comprising:

a dielectric board;

a waveguide structure penetrating the dielectric board from its surface to its reverse surface, having a predetermined cross-sectional opening shape, and having its inner wall coated with a conductor; and

a high-frequency connecting pad provided around said waveguide structure on the surface of said dielectric board.

11. A wiring substrate mounting structure in which a wiring substrate is placed on a surface of a wiring board, wherein

said wiring board comprises a waveguide structure penetrating a dielectric board from its surface to its reverse surface, having a predetermined cross-sectional opening shape, and having its inner wall coated with a conductor, and a high-frequency connecting pad provided around said waveguide structure on the surface of said dielectric board,

said wiring substrate has a dielectric substrate having a high-frequency component and a transmission line formed on its surface, said dielectric substrate being formed with an opening in a predetermined cross-sectional shape, a high-frequency connecting pad being formed around said opening on a reverse surface of said dielectric substrate, and a matching section for high-frequency coupling said transmission line and the waveguide structure to each other being formed in said opening, and

the high-frequency connecting pad in said wiring substrate and the high-frequency connecting pad in said wiring board are connected to each other.

12. The wiring substrate mounting structure according to claim 11, wherein

the dielectric substrate in said wiring substrate is composed of a ceramics insulating material, and

the dielectric board in said wiring board is composed of an insulating material containing organic resin.

13. The wiring substrate mounting structure according to claim 11, wherein

a high-frequency component is carried on said wiring substrate, and

a low-frequency component is carried on said wiring board.

14. The wiring substrate mounting structure according to claim 11, wherein

a conductor layer having the same opening shape as the opening shape of a waveguide is formed on a reverse surface of said wiring board.

15. The wiring substrate mounting structure according to claim 11, wherein

the dielectric board in said wiring board is formed with a screw hole for screwing an external circuit.

16. The wiring substrate mounting structure according to claim 11, wherein

the difference in coefficients of thermal expansion at room temperature to a temperature of 300°C between the dielectric substrate in said wiring substrate and the dielectric board in the wiring board is not more than $10\times10^{-6}/K$.

17. The wiring substrate mounting structure according to claim 11, wherein

a high frequency signal is transmitted to an external circuit having a waveguide port via the waveguide structure in said wiring board.

18. The wiring substrate mounting structure according to claim 11, wherein

another wiring substrate is mounted on the reverse surface of said wiring board.

19. A wiring substrate mounting structure, wherein

a plurality of wiring substrates having high-frequency components respectively carried thereon are mounted on a surface of a wiring board, and another wiring substrate is mounted

on a reverse surface of said wiring board,

said wiring board comprises at least two waveguide structures each penetrating a dielectric board from its surface to its reverse surface, having a predetermined cross-sectional opening shape, and having its inner wall coated with a conductor, and high-frequency connecting pads respectively provided around said waveguide structures on the surface and the reverse surface of said dielectric board,

each of said wiring substrates mounted on the surface of said wiring board has a dielectric substrate having a high-frequency component and a transmission line formed on its surface, said dielectric substrate being formed with an opening in a predetermined cross-sectional shape, a high-frequency connecting pad coated with a conductor layer around said opening being formed on a reverse surface of said dielectric substrate, and a matching section for high-frequency coupling said transmission line and the waveguide structure to each other being formed in said opening, and

said wiring substrate mounted on the reverse surface of said wiring board has a dielectric

substrate having a transmission line formed therein, said dielectric substrate being formed with two openings in a predetermined cross-sectional shape, a high-frequency connecting pad coated with a conductor layer around each of said openings being formed on the surface of said dielectric substrate, and a matching section for high-frequency coupling said transmission line and the waveguide structure to each other being formed in each of said openings, and

the openings of the wiring substrates mounted on the surface of the wiring board are respectively coupled to said two waveguide structures on the surface of said wiring board, and the opening of the wiring board mounted on the reverse surface of said wiring board is coupled to said two waveguide structures on the reverse surface of the wiring board.